

Minutes of the 21st meeting of WG8 Task Force 2

held at: G&D Training Center
Bretonischer Ring 3
D-85630 Grasbrunn (Vaterstetten), Germany
on: 2nd, 3rd and 4th February 2004

Participants:

Pascal ROUX	Convener, France
Franz HUBER	Austria
Reinhard MEINDL	Austria
Albert DOROFEEV	Belgium
Jean-Paul CARUANA	France
Frédéric HANAUER	France
Klaus FINKENZELLER	Germany
Michael HEGENBARTH	Germany
Rainer URIAN	Germany
Mickey COHEN	Israel
Hemy ITAY	Israel
Hiroshi KARIBE	Japan
Susumu KUSAKABE	Japan
Mikio MUKAI	Japan
Yoshihisa TAKAYAMA	Japan
Carlos COSSIO	Spain
Francis CHRISTIAN	USA
David DRESSEN	USA
Junichi SAKAKI	SC17/WG3

OPENING OF THE MEETING

1. The convener opened the twenty-first meeting of WG8 Task Force 2 by welcoming all the participants. He expressed special thanks to Giesecke & Devrient for the organisation of this meeting.

ROLL CALL

2. During the roll call, the convener asked all the participants to introduce themselves and to indicate their affiliations.

REVIEW OF THE MEMBERSHIP LIST

3. An attendance register was circulated during the meeting. The TF2 membership is mentioned in the document WG8 SD2. The participants are requested to register as TF2 members (through their national bodies) to get access to the TF2 documents on the WG8 website.

ADOPTION OF THE AGENDA

4. The agenda (document TF2 N404) was agreed with the following additions:
 - recommendations to SC17/WG3 about Machine Readable Passports;
 - interoperability issues.

APPROVAL OF THE LAST MEETING MINUTES

5. The minutes of the twentieth meeting in Paris (document TF2 N401) were approved.

REVIEW OF AVAILABLE DOCUMENTS

6. Documents submitted before this meeting were as follows:

TF2 N405 Austria / Arsenal research comments on WG8 SD4 proposals (Arsenal Research)
TF2 N406 Comparison between ASK and PSK (Philips)
TF2 N407 Comments/Proposal for standing document SD4 proposal 4, (LETI/CEA)
about the modulation index and waveform test with load

7. Five additional documents were submitted during this meeting:

TF2 N408 A compatibility test standards development for MRTD (SC17/WG3)
TF2 N409 Very high bit rates – Q factor and bandwidth (Japan)
TF2 N410 FCC Rule 15 update and changes (USA)
TF2 N411 ISO/IEC 14443 interoperability issues from USA national body(USA)
TF2 N412 Experimental measurement for PCD modulation test (Gemplus)
New reference PICC proposed by CEA/LETI

PREPARATION OF WD ISO/IEC 10373-6/AM4 "ADDITIONAL TEST METHODS FOR PCD RF INTERFACE AND PICC ALTERNATING FIELD EXPOSURE"**8. Standing document 4, proposal 4 (Modulation index and waveform test with load)**

The document TF2 N405 was presented by Franz Huber. He said that the loaded test is not necessary for type A because the Q factor decreases so the rise/fall times decrease also. On the contrary, Jean-Paul Caruana said that the loaded test may show a strong influence, especially at high bit rate.

The document TF2 N407 was presented by Pascal Roux. TF2 experts were interested by the proposed tool and request some more information to know exactly the position of the pincer shaped loop track (is the track in/on/out of the rectangles). Besides, all dimensions should be given in millimetres and protection of the components with a 15 V Zener diode should be implemented as mentioned in ISO/IEC 10373-6/AM2

The document TF2 N412 was presented by Jean-Paul Caruana. It shows that both real PICCs and reference PICC increase the overshoots. A larger overshoot may not be a problem for real PICCs to understand the PCD message. This should be confirmed, so that the test method may authorise larger overshoots when PCD modulation is tested with a load. Besides, this overshoot increase may be larger at higher bit rates.

The load still has to be decided, consistent with the maximum load decided in standing document 4, proposal 14.

9. Standing document 4, proposal 5 (Construction of the Reference PICC for field and power measurements)

The following results were given for R2 values at H_{min} and H_{max} :

- Arsenal Research reference PICC: 420-440 and 78 Ohms.

TF2 agreed that the warning in WD ISO/IEC 10373-6 AMD4 will give 400-550 and 75-85 Ohms for the two ranges of values for R2.

10. Standing document 4, proposal 11 (Improvement of the PCD load modulation reception test)

Pascal Roux summarised the difficulties noticed by Thierry Thomas when starting the tool design:

- the tool must produce the two side bands as magnetic field, so as current in a coil;
- this current must be independent from the impedance of this coil;
- this current must also be independent from the emf generated by the PCD in this coil;
- the side bands amplitude must be adjustable;
- the side bands adjusted level must be independent of the side bands phase adjustment.

Hemy Itay said that real PICCs have a side bands phase which does not vary so much among the different PICCs. So TF2 could specify limits for side bands phase (at least for Class 1 PICCs) and propose a simpler tool to represent this side bands phase range (e.g. a Reference PICC close to the one of ISO/IEC 10373-6, Annex E).

He also raised the question: are there interoperability problems with compliant PICCs due to PCD sensitivity (communication holes) ? Jean-Paul Caruana answered: yes, there are.

To decide whether a simpler tool may be sufficient, TF2 members are requested to measure all real PICCs they have and to distribute their results as TF2 contributions as soon as possible, (before the next TF2 meeting) so that TF2 members may contribute on the "right" tool before or during next TF2 meeting. The measurements will be made according to ISO/IEC 10373-6 and will give:

- the amplitude of the carrier and each side band;
- the phase of the carrier and each side band;

both given by the Discrete Fourier transformation.

11. Standing document 4, proposal 14

In WD ISO/IEC 10373-6 AMD4, Class 1 will be defined with the following additional requirements:

- the PICC antenna shall be included in a zone defined by two rectangles:
 - external rectangle: 81 mm x 49 mm, centred in ID1;
 - internal rectangle : 64 mm x 34 mm, centred in ID1;
- the PICC loading effect at H_{min} (1,5 A/m) shall be measured using the test PCD assembly; it shall not exceed the loading effect of the reference PICC (Annex D) calibrated for 6 V (dc) at H_{min} .

Note: this new test uses the substitution method proposed in document TF2 N394 (last page) and is performed with the following steps:

- place the reference PICC (annex D) in the DUT position of the test PCD assembly;
- calibrate this reference PICC for 6 V (dc) at H_{min} (monitored by the calibration coil of the test PCD assembly);
- measure the field strength H_R monitored by the calibration coil when the reference PICC is taken out;
- place the PICC under test in the DUT position of the test PCD assembly and re-adjust H_{min} if necessary;
- measure the field strength H_P monitored by the calibration coil when the PICC is taken out.

The field strength H_P shall be less than the field strength H_R .

- the PCD H_{min} (1,5 A/m) test shall be repeated with the reference PICC (annex D) calibrated for 6 V (dc) at H_{min} .

These requirements are summarised in document TF2 N415.

PREPARATION OF WD ISO/IEC 10373-6/AM5 "BIT RATES OF FC/64, FC/32 AND FC/16"

12. Communication quality test

Mickey Cohen proposed to add a test of bit error rate. After discussion, TF2 decided not to include such test in WD ISO/IEC 10373-6/AM5.

13. PCD RF tests

Modulation index and waveform

The additional test with a load (see standing document 4, proposal 4) will be run at all supported PCD to PICC bit rates and at any reference PICC position in the operating volume to find and measure the worst cases.

Operating volume, H_{min} , H_{max}

A note will indicate that if the PCD changes dynamically its Q factor, the test shall be repeated for each Q factor value.

14. PICC RF tests

To run the different PICC reception tests defined in ISO/IEC 10373-6/AM2 it was proposed to use different impedance matching networks for the test PCD assembly (or multiple test PCD assemblies, each one with a different impedance matching network), adjusted to provide specific rise/fall times, all this in order to avoid interpretation in measuring rise/fall times. The power amplifier driving the test PCD assembly will provide “fast” rise/fall times so that the rise/fall times of the field will depend only on the impedance matching network.

The impedance matching network must also be adapted to produce the minimum and maximum rise/fall times defined for high bit rates. Philips will make a contribution on this matter. Other contributions are welcome.

TF2 may consider adding a note to authorise other methods (low Q antenna + variable slope driver) but only if detailed contributions are received.

15. Project editing

Mickey Cohen will prepare a first document including only high bit rates switching tests which were in amendments 1 and 3 of ISO/IEC 10373-6.

A volunteer is still needed to be the project editor for the amendment 5 of ISO/IEC 10373-6.

AMENDMENTS TO 14443-2, 14443-3, 14443-4 AND 10373-6 FOR BIT RATES OF $f_c/8$ AND HIGHER

16. The document TF2 N409 was presented by Albert Dorofeev together with a demonstration by Susumu Kusakabe. The following clarifications were given:

- the tests were done at 5 cm but it should work well from 0 to 5 cm;
- PICC Rx: the measurements are done on the reference PICC antenna;
- PICC demodulation is not included in the demonstration;
- the PICC is tuned to 17 MHz, $Q = 20$ which gives nearly a single side band modulation with constant amplitude and phase between 14 and 16 MHz;
- the load modulation is the same as the Sony Felica card operating at $f_c/64$;
- at $f_c/8$ (the demo), the PICC is tuned to 17 MHz and a simple diode may work in the PICC;
- at $f_c/4$, the PICC should also be tuned to 17 MHz but a synchronous demodulator is required in the PICC;
- at $f_c/2$, the PICC should be tuned to more than 20 MHz and a synchronous demodulator is required in the PICC.

Hemy Itay pointed out that:

- the 17 MHz tuning prevents the PICC from receiving the whole PCD power and does not help to improve the amplitude modulation edges,
- the PCD demodulator seems excellent.

17. The document TF2 N406 was presented by Reinhard Meindl. The following comments were made:

- if the PICC demodulates current and not voltage the shunt regulator is not a problem in ASK;
- the PICC movement probably influences also the phase.

18. The functional (applicative) requirements were reviewed.

- Operating distance (PICC power consumption...): "As existing default bit rate PICCs" seems nice to have; a minimum could be 1.5 A/m.
- PICC speed (PICC movement): "As existing default bit rate PICCs" seems nice to have; at least 1 m/s in any direction; change of PICC orientation has more influence than pure translation; maybe bit rates of $f_c/8$ and higher will be used in applications with less movement than today applications but we should keep the requirement "As existing default bit rate PICCs".
- Amount of data transferred in a single block: probably more than 256 bytes but still to be defined
- Maximum bit rate in each direction (transaction time, total exchanged data, write time in PICC, bit error rate...): still to be defined
- PCD and PICC complexity: the more complex in the standard, the more difficult for the interoperability; complexity adds cost.
- PCD power: "As existing default bit rate PICCs" seems nice to have, but still to be defined

19. The reasons for bit rates of $f_c/8$ and higher were again given:

- memory capacity should be multiplied by 8 in 3 years
- applications like MRTDs and biometry will use large memory capacities
- if there is a need for bit rates of $f_c/8$ and higher, the work must be done in TF2 with ISO/IEC 14443 amendments for compatibility of future PICCs with existing PCDs.

It was reminded that PICC which will support any bit rate higher than the default bit rate ($f_c/128$) shall start (and be able to continue) the communication at the default bit rate, either using type A or type B communication interface.

20. As a conclusion, TF2 is continuing to gather information and determine the need for this technology in order to choose the best solution, which is not obvious. A log of the inputs will be kept and updated at each TF2 meeting.

RECOMMENDATIONS TO SC17/WG3 ABOUT MACHINE READABLE PASSPORTS

21. The document TF2 N408 was presented by Junichi Sakaki. After discussions TF2 prepared the document TF2 N414 summarising the feedback to assumptions given in document TF2 N408.

INTEROPERABILITY ISSUES

22. The document TF2 N411 was presented by Francis Christian.

Regarding RFU bits, the documents WD ISO/IEC 14443-3/AM3 and WD ISO/IEC 14443-4/AM1 to be approved for CD ballot will clarify the RFU value handling.

Regarding PCD standard, ISO/IEC 14443 series standardise the PICC-PCD interface and is supposed to specify all necessary PCD requirements. However, additional annexes in each part could summarise the PCD requirement. In addition, some requirements may be missing or not perfectly written. Contributions are requested for next TF2 meeting to clarify which particular requirements are missing or badly interpreted by those who read the standard, i.e. to clarify the causes of "lack of interoperability".

Regarding ATQA/ATQB proprietary bits, TF2 clarified that their use and their interpretation is free (as any proprietary bit) but must not change the ISO/IEC 14443 operation of the PCD.

Note: Formerly ATQA proprietary bits are now defined in ISO/IEC 14443-3/FPDAM1 and ISO/IEC 14443-3/PDAM3 to be balloted soon.

REMINDER ON ACTIONS

It is reminded that actions should be done as soon as possible so that resulting contributions are distributed much before the meetings. Thus, other actions and contributions may use these contributions as soon as available.

NEXT TF2 MEETINGS

- 23.** The twenty-second meeting will be held in Berlin, Germany in June 2004 from Monday 14th to Wednesday 16th.
- 24.** The twenty-third meeting will be held in Sydney, Australia in September 2004 from Wednesday 29th to Thursday 30th (to be confirmed).

Distribution: WG8 and TF2 members

Pascal ROUX